

	Type	L #	Hits	Search Text	DBs	Time Stamp	Comments
1	BRS	L1	1636596	head\$1 or print\$3head\$1	US- PGPUB; USPAT; EPO; JPO; DERWEN T; IBM_TDB	2004/11/23 22:16	
2	BRS	L2	862342	nozzle\$1 or orifice\$1	US- PGPUB; USPAT; EPO; JPO; DERWEN T; IBM_TDB	2004/11/23 22:17	
3	BRS	L3	177650	1 and 2	US- PGPUB; USPAT; EPO; JPO; DERWEN T; IBM_TDB	2004/11/23 22:17	
4	BRS	L4	626878	resistor or piezoelectric	US- PGPUB; USPAT; EPO; JPO; DERWEN T; IBM_TDB	2004/11/23 22:18	
5	BRS	L5	20632	3 and 4	US- PGPUB; USPAT; EPO; JPO; DERWEN T; IBM_TDB	2004/11/23 22:18	
6	BRS	L6	513663	etch\$3	US- PGPUB; USPAT; EPO; JPO; DERWEN T; IBM_TDB	2004/11/23 22:18	

	Type	L #	Hits	Search Text	DBs	Time Stamp	Comments
7	BRS	L7	4464	5 and 6	US- PGPUB; USPAT; EPO; JPO; DERWEN T; IBM_TDB	2004/11/23 22:19	
8	BRS	L8	109988	semiconductor adj wafer	US- PGPUB; USPAT; EPO; JPO; DERWEN T; IBM_TDB	2004/11/23 22:19	
9	BRS	L9	249	7 and 8	US- PGPUB; USPAT; EPO; JPO; DERWEN T; IBM_TDB	2004/11/23 22:20	
10	BRS	L10	2827	isotropical\$2 and anisotropical\$2	US- PGPUB; USPAT; EPO; JPO; DERWEN T; IBM_TDB	2004/11/23 22:21	
11	BRS	L11	5	9 and 10	US- PGPUB; USPAT; EPO; JPO; DERWEN T; IBM_TDB	2004/11/23 22:25	
12	BRS	L12	0	"6641744" and isotropical and anisotropical	US- PGPUB; USPAT; EPO; JPO; DERWEN T; IBM_TDB	2004/11/23 22:26	

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DISCLOSURE TEXT:

2p. This is an ink-drop-on-demand printing system requiring low drive voltages due to the amplification effect of a nozzle having

the shape of a truncated pyramid, a cone, etc.

- In Fig. 1 a head assembly 2 has a semiconductor wafer 4, which,

for example, may be silicon, mounted therein. A nozzle 6 in the form

of a truncated pyramid is etched in the silicon wafer using standard

etching techniques, with the larger diameter of the nozzle forming an

entrance aperture and the smaller diameter of the nozzle forming an

exit aperture. Channels 8 and 10 are also etched in the silicon wafer

for providing fluid flow paths for the printing ink.

- Ink is supplied from a reservoir (not shown) to a cavity

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with the ink then flowing through the channel 8 into the nozzle 6,

through the channel 10, through a cavity 14 and back to the reservoir. This circulation system removes air bubbles from the ink

and the pressure of the ink is sufficient to form a meniscus on the

exit aperture of the nozzle.

- A backing plate member 16 is formed within the assembly 2 and

has a thin-film piezoelectric crystal 18 which is centered within the nozzle 6, mounted thereon. A line 19 is connected to the crystal 18

such that when a pulse is provided to the line 19 the backing plate

member is caused to flex, thereby emitting a droplet from the exit

aperture of the nozzle. Due to the amplification characteristic of

the nozzle 6, low drive voltages may be utilized in the system.

- Fig. 2 illustrates another embodiment of the ink-drop-on-demand

printing system. A backing plate member 20 has a thick-film piezoelectric crystal 22 mounted thereon, with a plug member 24 mounted on the crystal 22, such that when an excitation voltage is

applied to the crystal 22 causing the crystal to flex, the plug member is moved in and out within the nozzle 6 causing an ink droplet

to be ejected from the exit aperture of the nozzle.

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FIG. 1

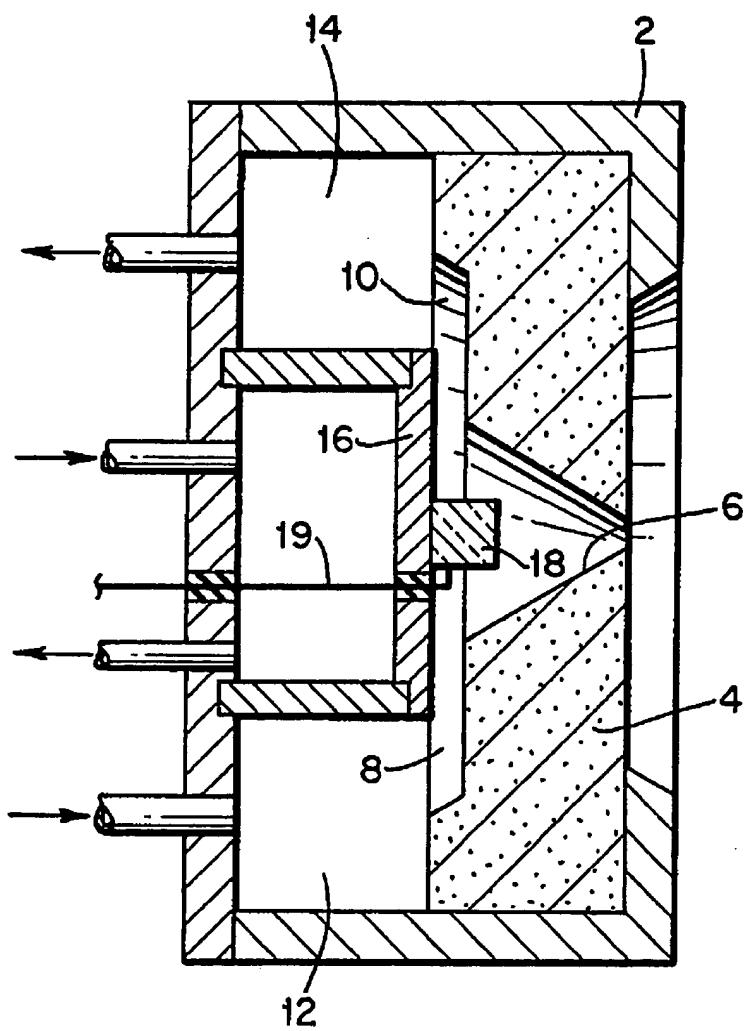


FIG. 2

